AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (currently amended): A speech coder comprising:

spectral parameter calculating means supplied with a speech signal for calculating spectral parameters and quantizing the speech signal;

impulse response calculating means for converting said spectral parameters into impulse responses;

adaptive codebook means for calculating a delay and a gain from a previous quantized excitation signal by the use of an adaptive codebook, predicting the speech signal to calculate a residue signal, and outputting said delay and said gain; and

excitation quantization means for representing an excitation signal of said speech signal by a combination of a plurality of pulses having nonzero amplitudes, and quantizing said excitation signal and said gain by the use of said impulse responses; wherein

said excitation quantization means holds a plurality of sets ~~for positions~~of tables each of which stores pulse positions of said pulses, calculates distortion between said speech signal and each of said plurality of sets of tables by the use of said impulse responses, selects ~~a set for positions~~one table and selects pulse positions in the selected table minimizing said distortion, and outputs ~~judgement~~judgment codes ~~representative of the selected set~~indicating the selected table, so that the ~~pulse position is quantized~~same table is used to decode the pulses at a receiver side.

2. (original): A speech coder as claimed in claim 1, further comprising:

multiplexer means for producing a combination of the output of said spectral parameter calculating means, the output of said adaptive codebook means, and the output of said excitation quantization means.

3. (currently amended): A speech coder comprising:

spectral parameter calculating means supplied with a speech signal for calculating, quantizing and outputting spectral parameters;

impulse response calculating means for converting said spectral parameters into impulse responses;

adaptive codebook means for calculating a delay and a gain from a preceding quantized excitation signal by the use of an adaptive codebook, predicting the speech signal to calculate a residue signal, and outputting said delay and said gain; and

excitation quantization means for representing excitation signal of said speech signal by a combination of a plurality of pulses having nonzero amplitudes, and quantizing and outputting said excitation signal and said gain by the use of said impulse responses; wherein

said excitation quantization means holds a plurality of sets ~~for positions~~of tables each of which stores pulse positions of said pulses, calculates distortion between said speech signal and each of said plurality of sets of tables by the use of said impulse responses, selects at least one ~~set for positions~~table and selects pulse positions in the selected table minimizing said distortion, reads gain code vectors out of a gain codebook for each of said plurality of sets to quantize a

gain, calculates distortion between said speech signal and the gain, selects a combination of said positions minimizing said distortion and said gain code vectors, and outputs ~~judgement~~judgment codes ~~representative of~~indicating the selected ~~set for positions~~table.

4. (original): A speech coder as claimed in claim 3, further comprising:

multiplexer means for producing a combination of the output of said spectral parameter calculating means, the output of said adaptive codebook means, and the output of said excitation quantization means.

5. (currently amended): A speech coder comprising:

spectral parameter calculating means supplied with a speech signal for calculating, quantizing and outputting spectral parameters;

impulse response calculating means for converting said spectral parameters into impulse responses;

adaptive codebook means for calculating a delay and a gain from a preceding quantized excitation signal by the use of an adaptive codebook, predicting the speech signal to calculate a residue signal, and outputting said delay and said gain; and

excitation quantization means for representing excitation signal of said speech signal by a combination of a plurality of pulses having nonzero amplitudes, and quantizing and outputting said excitation signal and said gain by the use of said impulse responses; wherein

said excitation quantization means comprises mode judging means for judging and outputting a mode by extracting feature quantities from the speech signal; and

in the case where the output of said judging means is a predetermined mode, said excitation quantization means holds a plurality of sets ~~for positions~~of tables each of which stores pulse positions of said pulses, calculates distortion between said speech signal and each of said plurality of sets of tables by the use of said impulse responses, selects ~~a set for positions~~one table and selects pulse positions in the selected table minimizing said distortion, and outputs ~~judgement~~judgment codes ~~representative of~~indicating the selected ~~set for positions~~table, so that the ~~pulse position is quantized~~ same table is used to decode the pulses at a receiver side.

6. (original): A speech coder as claimed in claim 5, further comprising:

multiplexer means for producing a combination of the output of said spectral parameter calculating means, the output of said adaptive codebook means, the output of said excitation quantization means and the output of said mode judging means.

7. (currently amended): A speech coder comprising:

plural position-sets storing means for holding a plurality of sets ~~for positions~~of tables each of which stores pulse positions of pulses; and

excitation quantization means for calculating distortion between a speech signal and each of said plurality of sets of tables, so as to select ~~a set for positions~~one table and select pulse positions in the selected table minimizing said distortion.

8. (currently amended): A speech decoder comprising:

demultiplexer means supplied with a first code for spectral parameters, a second code for an adaptive codebook, a third code for an excitation signal, a fourth code representative of a selected ~~set for positions~~ one of a plurality of sets of tables each of which stores pulse positions of pulses, and a fifth code representative of a gain, for demultiplexing them into each code;

excitation signal producing means for producing adaptive code vectors by the use of said second code, pulses of nonzero amplitudes by the use of said third and said fourth codes, and an excitation signal by multiplying them by the gain based on said fifth code; and

synthesis filter means which has spectral parameters and which is responsive to said excitation signal, for producing a reproduced signal.

9. (currently amended): A speech decoder comprising:

demultiplexer means supplied with a first code for spectral parameters, a second code for an adaptive codebook, a third code for an excitation signal, a fourth code representative of a selected ~~set for positions~~one of a plurality of sets of tables each of which stores pulse positions of pulses, a fifth code representative of a gain, and a sixth code representative of a mode, for demultiplexing them into each code;

excitation signal producing means for producing adaptive code vectors by the use of said second code, and furthermore, in the case where said sixth code is a predetermined mode, producing pulses having nonzero amplitudes for the selected set for positions by the use of said third and said fourth codes, and producing an excitation signal by multiplying them by the gain based on said fifth codes; and

synthesis filter means comprising spectral parameters, said synthesis filter means responsive to said excitation signal, for producing a reproduced signal.

10. (currently amended): A speech coding method comprising:

first step of responding to a speech signal to calculate spectral parameters, and to quantize said speech signal;

second step of converting said spectral parameters into impulse responses;

third step of calculating a delay and a gain from a preceding quantized excitation signal by the use of an adaptive codebook, predicting the speech signal to calculate a residue signal; and

fourth step of representing excitation signal of said speech signal by a combination of a plurality of pulses having nonzero amplitudes, quantizing said excitation signal and said gain by the use of said impulse responses, calculating distortion between said speech signal and each of ~~said~~ a plurality of sets ~~for positions~~of tables each of which stores pulse positions of said pulses by the use of said impulse responses, selecting ~~a set for positions~~one table and selecting pulse positions in the selected table minimizing said distortion, and outputs ~~judgement~~judgment codes ~~representative of~~indicating the selected ~~set~~table, so that the ~~pulse position is quantized~~same table is used to decode the pulses at a receiver side.

11. (original): A speech coding method as claimed in claim 10, further comprising a step of producing a combination of the outputs of said first, said second and said fourth steps.

12. (currently amended): A speech coding method comprising:

first step of responding to a speech signal to calculate and quantize spectral parameters;

second step of converting said spectral parameters into impulse responses;

third step of calculating a delay and a gain from a preceding quantized excitation signal by the use of an adaptive codebook, and predicting the speech signal to calculate a residue signal; and

fourth step of representing excitation signal of said speech signal by a combination of a plurality of pulses having nonzero amplitudes, quantizing said excitation signal and said gain by the use of said impulse responses, calculating distortion between said speech signal and each of ~~said~~ a plurality of sets ~~for positions~~ of tables each of which stores pulse positions of said pulses by the use of said impulse responses, selecting at least ~~one set for positions~~ one table and selecting pulse positions in the selected table minimizing said distortion, reads gain code vectors out of a gain codebook for each of said plurality of sets to quantize a gain, calculating distortion between said speech signal and the gain, selecting a combination of said positions minimizing said distortion and said gain code vectors, and outputting ~~judgement~~judgment codes ~~representative of~~indicating the selected ~~set for positions~~table.

13. (original): A speech coding method as claimed in claim 12, further comprising a step of producing a combination of the outputs of said first, said second and said fourth steps.

14. (currently amended): A speech coding method comprising:

first step of responding to a speech signal to calculate and quantize spectral parameters;

second step of converting said spectral parameters into impulse responses;

third step of calculating a delay and a gain from a preceding quantized excitation signal by the use of an adaptive codebook, and predicting the speech signal to calculate a residue signal;

fourth step of judging a mode by extracting feature quantities from the speech signal; and

fifth step of representing excitation signal of said speech signal by a combination of a plurality of pulses having nonzero amplitudes, quantizing said excitation signal and said gain by the use of said impulse responses, and furthermore, in the case where the output of said fourth step is a predetermined mode, calculating distortion between said speech signal and each of ~~said~~ a plurality of sets ~~for positions~~ of tables each of which stores pulse positions of said pulses by the use of said impulse responses, selecting ~~a position set~~ one table and selecting pulse positions in the selected table minimizing said distortion, and outputting ~~judgement~~judgment codes ~~representative of~~ indicating the selected ~~set for positions~~table, so that the ~~pulse position is quantized~~ same table is used to decode the pulses at a receiver side.

15. (original): A speech coding method as claimed in claim 14, further comprising a step of producing a combination of the outputs of said first, said second, said fourth and said fifth steps.

16. (currently amended): A speech coding method comprising steps of calculating distortion, between a speech signal and each of a plurality of sets ~~for positions~~of tables each of which stores pulse positions of pulses; and selecting ~~a set for positions~~ one table and pulse positions in the selected table which minimizes said distortion.

17. (currently amended): A speech decoding method comprising:

first step of responding to a first code for spectral parameters, a second code for an adaptive codebook, a third code for an excitation signal, a fourth code representative of a selected ~~set for positions~~ one of a plurality of sets of tables each of which stores pulse positions of pulses, and a fifth code representative of a gain, to demultiplex them into each code;

second step of producing adaptive code vectors by the use of said second code, producing pulses having nonzero amplitudes by the use of said third and said fourth codes, and producing an excitation signal by multiplying them by the gain based on said fifth code; and

third step of responding to said excitation signal to produce a reproduced signal.

18. (currently amended): A speech decoding method comprising:

first step of responding to a first code for spectral parameters, a second code for an adaptive codebook, a third code for an excitation signal, a fourth code representative of a selected ~~set for positions~~ one of a plurality of sets of tables each of which stores pulse positions of pulses, a fifth code representative of a gain, and a sixth code representative of a mode, to demultiplex them into each code;

second step of producing adaptive code vectors by the use of said second code, and furthermore, in the case where said sixth code is a predetermined mode, producing pulses having nonzero amplitudes for the selected ~~set for positions~~one of a plurality of sets of tables by the use of said third and said fourth codes, and producing an excitation signal by multiplying them by the gain based on said fifth code; and

third step of, in response to said excitation signal, producing a reproduced signal.